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TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

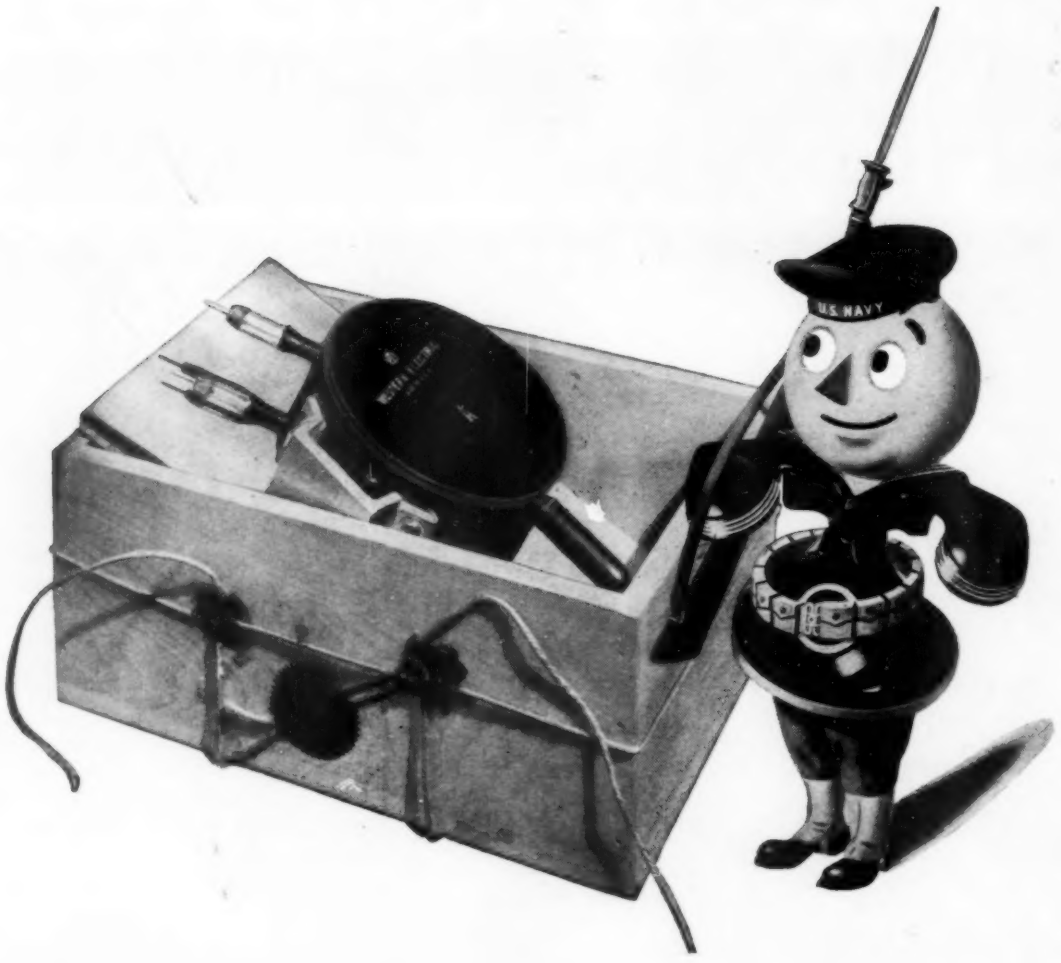
DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE • OCTOBER 13, 1945

Eye Test

See Page 227

A SCIENCE SERVICE PUBLICATION



VICTORY REVEALS A MYSTERY

More than two years ago, an engineer of the Laboratories visited *U.S.S. Boise*, returned with a mysterious box which went into the Laboratories' vault. Now, victory opens the box and discloses a special kind of electron tube called a magnetron. It was part of a Radar which furnished data to aim *U.S.S. Boise's* guns during the night action off Savo Island on October 11-12, 1942. Because of the high frequency generated by this magnetron, the Radar was not detected by the enemy and the action was a complete surprise. Six Japanese warships were sent to the bottom of the sea.

This magnetron is a symbol of the Laboratories' enormous war program. Half of it was devoted to Radar, the other half gave birth to radio transmitters and receivers, sonar apparatus for the Navy, loudspeaker systems for ships and beachheads, fire-control apparatus for anti-aircraft artillery. Coming months will unfold the story of these and many other contributions of the Laboratories to the victory of our arms.

Bell Telephone Laboratories' war work began before the war; until now, it claimed practically all our attention. With victory, we will go back to our regular job — helping to bring you the world's finest telephone service.

BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting, for continued improvements and economies in telephone service

MEDICINE

Carbon Dioxide for Polio

Inhalations of carbon dioxide in oxygen have given good results in first cases reported. Given continuously for 24 to 38 hours after patient is admitted.

➤ A NEW treatment for infantile paralysis is being tried at Charity Hospital, New Orleans, La. The treatment consists essentially in putting the small patients in an oxygen tent where they inhale 5% carbon dioxide in oxygen.

Good results in all but one of 13 cases are reported in a preliminary announcement made to Science Service by Dr. Branch J. Aymond, of the Louisiana State Board of Health, Dr. Ralph V. Platou, professor of pediatrics at Tulane University School of Medicine, and Dr. G. Pelton Kelly, also of Tulane.

The treatment was first tried as an emergency measure for a six-year-old girl with acute encephalitis, bulbar and spinal poliomyelitis. Dramatic improvement followed the inhalations of carbon dioxide in oxygen.

"The response was so impressive that this simple and apparently harmless procedure was employed in 12 other cases having varying manifestations," the doctors report.

In all but one case there was relaxation, prompt relief of pain, rapid return of muscle strength, early functional improvement and the patients volunteered the information that they felt well.

Appreciating that the course of infantile paralysis varies greatly from one patient to another, almost regardless of the kind of treatment given, and that no claim can be made for a treatment tried in such a small number of cases, the doctors nevertheless feel it is worth calling to the attention of other workers for independent evaluation.

At present the carbon dioxide-oxygen inhalations are given continuously for 24 to 36 hours after the patient enters the hospital or intermittently for one to two hours several times daily. Other general measures for treating infantile paralysis are being continued.

The effects of rebreathing and of using varying mixtures of carbon dioxide in oxygen are now being studied. The scientists also plan experiments to test the relation of carbon dioxide to production of acetylcholine, a chemical liberated from nerves when they are stimulated.

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CAUSES "SUNTAN"—An alkali substance present in all ultraviolet-transmitting materials except a new glass and quartz causes glass to pick up a "suntan" under the bombardment of invisible ultraviolet radiation. Here, Dr. Harvey C. Rentschler, research director for the Westinghouse Lamp Division, is shown studying spectral lines of the metallic elements in glass. This is the final step in his experiment which led to the discovery.

BIOLOGY

Eyes Need More Protection

Damage to sight from ultraviolet light may occur without obvious signs of eye injury, studies with baby chicks show.

See Front Cover

➤ WELDERS and their helpers, skiers, flyers and sunbathers may need more eye protection from ultraviolet light than has previously been supposed, it appears from studies reported by Dr. Ernest Wolf, of the Harvard Biological Laboratories, to the National Academy of Sciences.

The danger of "snow-blindness" among skiers and Arctic explorers and of eye damage among persons exposed to invisible ultraviolet light on their jobs is well known, Dr. Wolf points out. He has found, however, that more of the ultraviolet is dangerous than had previously been supposed.

Ultraviolet light is invisible and consists of light waves shorter than those that give visible light. Visible light starts with waves 400 millimicrons long and goes on to waves 750 millimicrons long. Short might seem a better way of describing their length since one millimicron is only 1/25,400,000 of an inch.

The waves of ultraviolet light are all shorter than 400 millimicrons but scientists have heretofore thought that ultraviolet between about 300 and 400 millimicrons in length did not harm the eyes. Dr. Wolf's studies, sponsored by the American Optical Company, show that ultraviolet ranging in wavelength from 300 to 365 millimicrons can damage visual function even though the eyes themselves show no injury.

His studies were made with baby chicks, as shown on the front cover of this SCIENCE NEWS LETTER, since their eyes are very similar to human eyes and since the chicks will keep their eyes wide open during exposure to ultraviolet light. Tests on human eyes could not be made because of the possibility of damaging the eyes.

The chicks were first exposed to ultraviolet light from a quartz mercury lamp for an hour. The lights were then switched off and the chicks left in complete darkness for an hour. This would have been more than enough time for their eyes, if unaffected, to have become adapted to the dark and their visual functions would have been normal.

The chicks were then placed in individual glass jars, each jar surrounded by a glass cylinder bearing alternate transparent and opaque vertical stripes. The stripe system moved at a given rate and produced flicker to which the chick responded by jerky head motions. The

experiment determined the intensity of light needed for flicker recognition.

In comparison with unexposed chicks, the test chicks, due to ultraviolet injuries, required 45 times as much light to recognize the flickering stripes. Not until three days later could their eyes see normally again. By shielding the ultraviolet lamps with protective glass filters that cut out the invisible ultraviolet light at about 365 millimicrons and below, it was discovered that the eyes of chicks exposed to the filtered light functioned normally.

The lamps were then shielded with a series of less efficient glass filters that cut out shorter ultraviolet radiations. Repeated experiments with these filters revealed that ultraviolet below about 365 millimicrons impaired visual functions in varying degrees depending on the wave length transmitted.

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ECONOMICS

Curb German Production

Engineering Council recommends that she be debarred from production of nitrogen, aluminum, synthetic liquid fuels, atomic energy and oversupply of steel.

➤ TO DESTROY German militarism and insure that Germany will never again be able to start another war, a joint council of American engineers recommends that this twice-aggressor nation be prohibited from the synthetic fixation of nitrogen, the production of aluminum and of synthetic liquid fuels, have only limited capacities for steel and steel alloys production, and be prevented from any attempt to develop or use atomic energy.

The joint council that makes this recommendation is composed of 35 prominent engineers and technological specialists representing five of the leading national American engineering organizations. Its complete report is based on several months of study and was recently transmitted to the proper government authorities in Washington. It is now released to the public in New York at the council's headquarters.

The organizations with representatives on the joint council are the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Institute of Electrical Engineers, American Society of Mechanical Engineers, and the American Institute of Chemical Engineers.

The report is built around the expressed philosophy that "it is necessary to subtract from aggressor peoples, for a long period of recuperation, the fundamentals of their industrial potential for armed aggression." At the same time it is held that "complete elimination of German industries, leaving agriculture as the sole occupation, would produce an economic dislocation and social chaos of destructive magnitude, not alone in Germany but throughout Europe."

The report details the industrial factors that must be controlled. Control must be exerted, it states, over energy allocation; raw material elimination or limitation, applied to specific elements critical to war industry; processing, fabricating and new construction; scientific research; and economic subsidies.

Coal stands at the head of the list in the field of energy and among the raw materials in German economy, it says. Coal supplies 85% of the nation's energy in power and light, and is the raw material for Germany's huge chemical industry, the synthetic nitrogen industry and the synthetic fuel industry. Coal production should therefore be controlled, the council feels.

Modern war is impossible, the report declares, without a number of products required in large quantities. These include nitrogen for explosives, aluminum for air power, steel and steel alloys for land and sea warfare, and liquid fuels and lubricants to insure mobility of the instruments of war.

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INVENTION

Double Adhesive Sticks Rubber to Metal

➤ RUBBER should be, in many ways, the ideal protective coating for metal: it is water- and acid-proof, and some of the synthetic varieties are oil-proof also. The big drawback is that rubber doesn't want to stick to metal, but is always peeling off at just the wrong moment.

For better bonding of rubber to metal, Henry H. Harkins uses a double adhesive. First he coats the metal with a synthetic resin of the Bakelite type—phenol-aldehyde compound. This sticks well to metal. Then he sticks the rubber to this with a cement composed of rubber, a resin, and an oxidizing material.

Patent 2,386,112, covering this bonding system, is assigned to the United States Rubber Company.

Science News Letter, October 13, 1945

De-inking paper, in the repulping process to make new paper, is carried out with sodium metasilicate and rosin soap added after pulping; the alkali and rosin lift the inks from the surface, and emulsify the oily base.

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TOPOGRAPHY—GEOLOGY

Maps for Victory

Geological and topographical maps made in Washington gave Allied armies advanced information of terrain in enemy country for invasion or advancement.

➤ GEOLOGICAL and topographical maps of enemy country made by the U. S. Geological Survey, showing terrain to be traversed in invasions and advances in Europe and in the Pacific area, played an important part in the war, it is now revealed. A secret group of 80 military geologists is responsible for these charts, which indicated both surface and underground formations.

The data necessary to make such maps showing rocks, mountains, streams, plains, types of soil and other conditions, were derived in large part from geological maps and information collected in prewar days from geologists all over the world and preserved in the library of the Geological Survey. Most geologists who make maps exchange their product freely. The primary reason for the preservation of foreign maps is their economic value, but they proved to have an unforeseen military use of great importance.

This military geological unit furnished the Army with complete geological folios covering every operation in which American troops took part or planned to take part, with the exception of Normandy, handled chiefly by British geologists, and the Gilbert islands, about which the unit had no specific or reliable information.

The folio charts showed much more than surface conformation. They indicated where the soil was suitable for digging foxholes, where to establish observation posts and pillboxes, where the safest and most protected trails were located, where roads could be constructed, where bridges could be built and where streams could be forded without bridges.

The charts indicated also where wells could be drilled with a reasonable probability of obtaining fresh water, and if underground conditions were satisfactory in areas where the surface seemed suitable for the construction of an airfield. They furnished every bit of information available relative to surface or sub-surface geological conditions that might have any value to a mechanized fighting force.

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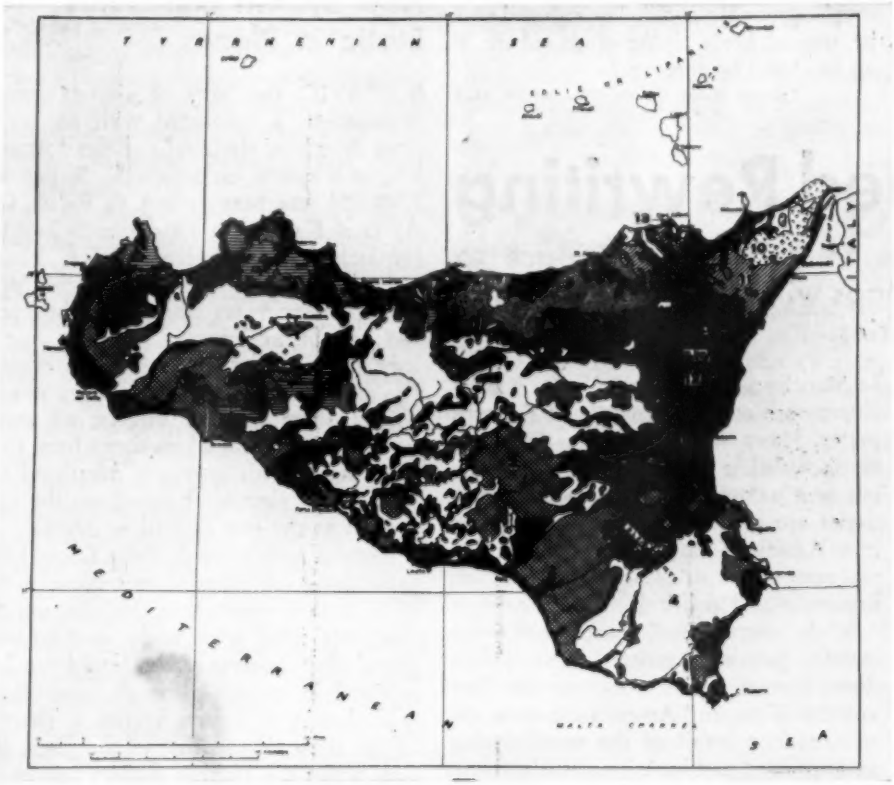

FOR VICTORY—This pattern of dots, dashes and shadows revealed to the Military Geology Unit of the Interior Department and Army Engineers the number and location of springs and other sources of good water in East Sicily, where airfields might be built or camouflaged and the safest places for our ground forces to land, march and fight.

PHOTOGRAPHY—ELECTRONICS

Automatic Radar Camera Embodies New Principle

➤ EXPECTED to have both military and commercial applications, an automatic radar recording camera developed by the Fairchild Camera and Instrument Corporation of New York permits an operator to observe the luminous picture on the radar oscilloscope while the camera is recording the image on 35-millimeter motion picture film.

Wired directly into the radar circuit and mounted above the oscilloscope, the camera, containing a beamsplitter in the viewing hood, passes yellow light to the eye, reflects only the more actinic blue light upward to the lens, with little danger of fogging the film.

The camera is of the interchangeable magazine type, holding 100 feet of film. Its action is fully automatic, the shutter opening at the beginning of the radar impulse, closing as the film is moved for the next exposure. A selector switch controls the range of exposures of once every scan, every other scan, three out of 12 scans or five out of 60 scans.

In the recording chamber, a watch, data card and six indicator lights record on each frame the time, number of exposure, range setting, altitude and scale for permanent reference.

Operating at extremes of temperature and altitudes up to 35,000 feet, the camera, through the radar scope, is also said to have a range of 100 miles on a single frame compared to the standard aerial camera's usual range of five miles.

Although developed primarily for use with radar, other applications may be made, including laboratory experiment recording, and like uses requiring an automatic permanent record.

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MEDICINE

Fed by Vein for 8 Weeks

The patient was able to undergo a major surgical operation. Was given salt and sugar solution, enzymic-digest of casein, and vitamins C, B and K.

➤ THE CASE of a patient who was fed entirely by vein for eight weeks, taking nothing by mouth except an occasional glass of water, is reported by Drs. Alexander Brunschwig and Robert R. Bigelow and Miss Sabra Nichols, of the University of Chicago Department of Surgery, in the *Journal of the American Medical Association* (Oct. 6).

The patient's condition was "fair to good" during this long period of feeding by vein. After 46 days of it he was able to undergo a major surgical operation. The scientists believe he would not have been able to remain in as good condition and withstand the operation if he had not been benefiting from the vein feeding.

The daily diet injected into his veins consisted essentially of about three pints of salt and sugar solution and two pints of fluid containing sugar and an enzymic digest of casein to supply protein. Sometimes he was given a gelatin solution. Vitamins C, B, and K were given at intervals by hypodermic injection. He was also given five blood transfusions.

The reason for feeding the patient by vein instead of mouth was the development, following removal of a cyst on the kidney, of a large fistula high in the small intestine. The experience in this case, the scientists state, suggests that similar conditions may be treated by withholding all food by mouth and feeding by vein. Often in such cases the discharges from the fistulas or openings digest the wound edges, thus preventing healing, and also depleting the patient's condition because of loss of partially digested food. If the patient can be kept nourished without food going into his stomach and intestinal tract, these complications are avoided or reduced and the wound heals to the stage where it can be closed by surgery.

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GEOGRAPHY

Textbooks Need Rewriting

Geographies will have to devote more space to Asia and the Pacific islands. Maps will have to be changed to show new national boundaries.

➤ GEOGRAPHY textbooks for American schools now need rewriting, with more space devoted to Asia and the Pacific islands, because political and economic developments which will have a direct bearing on America may be expected in that area. China has the population and the natural resources to become to Asia what the United States is to the Western Hemisphere; Russia becomes a Pacific naval power; an independent Korea will be to some extent an American responsibility; Japan may have to be under American control for years, and many Pacific islands will probably become permanent possessions of the United States.

Of course, maps will have to be changed to show the new national boundaries, in Europe as well as Asia, and the right names will have to be given. Manchukuo, so called by the Japs, will be Manchuria again, and Chosen will be Korea once more, the name the Koreans prefer. Many other Japanese names will be discarded in favor of original names, but new names and new national boundaries are not the principal reasons for new American school geographies. The real reasons are strategic, social, cultural, economic and political.

With aircraft, radio and fast ocean vessels, personal contact has broken down former barriers between the East and the West, and America can now expect, as one result of the war, to play an important part in Asiatic development. As a preparation, American youth needs accurate, reliable information relative to the peoples of Asia and the Pacific islands, their customs, culture, economics, and natural resources, and the physical conditions of the regions in which they live.

The Near East, in the future, may produce, under American and English leadership, much of the world's supply of oil and petroleum products; India is setting out on a program in training scientists, following American procedures, to develop India's industries and agriculture and to provide better health for her people; and China, in gratitude to America for her assistance during the war, will look to us for help in becoming a real democracy and a truly great industrial and agricultural nation.

From a strategic standpoint, American youth needs a knowledge of Asia and the Pacific. Japan will require watching, and perhaps military control, for many years. The Soviet Union, now in possession of the Kuriles, Sakhalin island and excellent ice-free ports and naval bases on the mainland coast, assumes a new importance in the Pacific area. China may, and probably should, become a naval power. These factors alone are sufficient reasons for more complete geography courses in American schools.

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RADIO—AERONAUTICS

New System Eliminates Static in Planes

➤ STATIC, the bane of aircraft communication, is combated with an artificial drizzle of electrically charged droplets, in a system on which U. S. patent 2,386,084 has been issued to Ralph C. Ayres of Kansas City, assignor to Transcontinental and Western Air, Inc.

To drain away the static charges, Mr. Ayres first provides a kind of lightning-rod system in reverse: three or more long rods or trailing wires from wing-tips and tail, together with a larger number of short metallic fingers; all connected together but all insulated from the plane itself. This system is calculated to pick up an electric charge from the air directly to the rear of trailing edges.

Curved over towards these finger-like projections are nozzles conveying a liquid from a reservoir within the plane. They are filled with wicks, and so adjusted that droplets of the liquid can be released in controlled small quantities. This liquid of course carries a charge of the same sign as that of the plane itself, while the trailing fingers and rods are oppositely charged. Therefore each droplet carries away with it a small fraction of the plane's static charge, which is neutralized without fuss or sputter when the droplet is attracted to the trailing metallic system.

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CHEMISTRY

New Role for Amino Acids

Studies suggest that some of them may be chiefly used by the pituitary gland, hazelnut-sized organ at the base of the brain.

➤ THE ESSENTIAL amino acids furnished by animal proteins such as meat, cheese and eggs have assumed a new role in nutrition as a result of studies by Dr. L. T. Samuels of the University of Utah.

Heretofore scientists have believed these amino acids were required and used by the body directly in production of its own protein tissue in flesh and blood. Dr. Samuel's studies suggest that some amino acids may be chiefly used by the pituitary gland, hazelnut-sized organ at the base of the brain.

This small but highly influential gland produces chemicals called hormones. Among them are one that influences growth, another that influences activity of the adrenal glands, and others that effect other glands such as the thyroid and sex glands.

Through its various hormones, this gland plays a role in the body's ultilization of carbohydrate, fat and protein foods, Dr. Samuels reported at the third annual hormone conference at Mont Tremblant, Canada.

If an animal whose pituitary gland has been removed is fed the same diet that will keep a normal animal growing and healthy, the animal without the pituitary gland will also increase in weight but not as much as the normal one. Its weight increase, moreover, will be almost entirely in deposits of fat, rather than in formation of muscles and other tissues.

The picture is reversed if the animal is given both pituitary growth hormone and thyroid hormone. Then the animal gains weight more rapidly than the normal animal, but stores more water and protein and less fat.

Under these circumstances, the animal which increases most in weight is also the one which consumes the greatest amount of his food as energy. The reason for this, Dr. Samuels explained, is that the weight gain comes from stored water and low energy material, that is, protein.

From this and similar studies Dr. Samuels reasons that the value of protein to the animal will be affected by the pituitary gland if this gland affects protein storage. The biological value of protein will be much lower in an animal without its pituitary and particularly if the gland is failing to produce its growth hormone.

Starvation, other scientists have found, affects the pituitary gland very early. One of the first things that happens is a wasting of the sex glands, resulting from decreased production of the pituitary hormone affecting these structures. The wasting can be reversed even in a starving animal if pituitary gonadotropic hormone is given.

This effect of starvation on the pituitary gland is not a question of vitamin lack, Dr. Samuels stated. No one knows exactly what the factor responsible for it is. It may involve the amino acids. If so, the relative biologic value of a protein food may be determined not only by its general effect on body cells but by its ability to supply what the pituitary glands needs to produce its hormones.

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ENGINEERING

Long Distance 'Phone Calls May Be Automatic

➤ ALL LONG distance telephone operators will some day be dialing calls, directly and unassisted, straight through to the called telephone even though it be at the other side of the continent. This method, now in operation to a certain extent, is the announced objective of the American Telephone and Telegraph Company, according to a recent statement made by its president, Walter S. Gifford.

The ultimate aim, Mr. Gifford states, goes further, and will be reached when telephone subscribers can dial "anyone anywhere in the United States or perhaps anywhere in the world just as simply and promptly as you dial the telephone of a neighbor in your own home town." This long-range goal, he says, is "undoubtedly many years away from practical use."

The first plan is already in use. About 5% of the daily 2,700,000 toll board calls are now being handled by the operator toll dialing method. Under this method the customer dials the outward toll operator, who in turn completes the call to the distant telephone through toll dial equipment, usually without the assistance of another operator.

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MEDICINE

Forensic Medicine Institute To Be Established

➤ AN INSTITUTE of Forensic Medicine, first of its kind in the world, will be established at New York University College of Medicine as part of its expanded postwar educational program.

The new institute will give instruction in legal medicine. It will be owned by New York City and operated in partnership with the university as a collaborative venture between it and the city's Medical Examiner's Office. Besides training medical examiners to replace old-style coroners in criminal investigation, the institute is expected to play a leading part in the exploration of medico-legal problems in America.

Medical needs of the middle-income group are emphasized in the designs for the university's new hospital and medical college buildings. Despite its name, New York University is privately supported and governed, receiving no city or state funds.

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MEDICAL CENTER — Architects' drawing of the proposed New York University-Bellevue Medical Center between 25th and 34th streets, First Avenue and East River Drive.

MEDICINE

Streptomycin Now in Use In Army Hospitals

➤ CIVILIANS are not the only ones having difficulty in obtaining streptomycin, new sister drug to penicillin. Although this new antibiotic is now being used in 30 Army general hospitals, joint Army-Navy expectations for September are about double the anticipated production, it appears from a statement made by Maj. Gen. Norman T. Kirk, Surgeon General of the Army.

"Joint Army-Navy expectations for September are 162 ounces," he said, "but it is anticipated that production will be not more than 70 ounces. It is hoped that Army-Navy procurement can be doubled in October—for military needs alone now are about 2,000 ounces a month."

The standard daily dose, given in three injections over a 24-hour period, is one gram, or about one-thirtieth of an ounce.

Production of streptomycin is limited because it is obtained from an organism found in the soil and must be grown under carefully controlled laboratory conditions which cannot be hurried.

Similar difficulties in production of penicillin in the early days were overcome in part because of the pressure of war needs and with the aid of wartime priorities. The industry, Gen. Kirk said, is doing what it can to supply the demand for streptomycin without the aid of the advantages penicillin production had.

General Kirk explained that the Army's principal needs are for treatment of soldiers with severed spinal cords who developed urinary tract infections because of a loss of bladder function; and to some extent in treating some cases of meningitis and other infections which do not respond readily to penicillin therapy.

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ORDNANCE

All-Electric Torpedo Used Against Jap Shipping

➤ ANOTHER SECRET weapon used successfully against the enemy, the Mark 18 all-electric torpedo is credited with sinking over a million tons of Japanese shipping, some 300 ships, ranging in size from 500 ton cargo vessels to 42,500 ton battleships.

Announced by the Navy Department, the torpedo, its electric motors powered by specially designed storage batteries, speeds just below the surface of the water leaving no tell-tale wake to warn the enemy in time to maneuver out of its path.

The boiling wake left by steam turbine driven torpedoes points a finger of bubbles to the approximate position of the submarine, and destroyers have but to charge back through the torpedo's course and drop depth charges in the area before the slow moving submarine can slink off to safety. Submarines, if not destroyed by the depth charges, frequently suffer damage caused by the concussion of the exploding charge.

Designed specifically for under water firing, the Mark 18, less able to withstand the impact of striking the water in above-the-surface firing, is not used by PT boats, torpedo bombers or destroyers. Gyroscopically controlled, it is over 20 feet long, weighs about one and a half tons and contains some 2,000 parts.

Manufactured solely by Westinghouse Electric Corporation's plant at Sharon, Penna., its cost is approximately $6,500, about two-thirds that of the corresponding steam torpedo for submarine use. The first attack by electric torpedo fired by a U. S. submarine was made in September, 1943.

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PSYCHIATRY

Mentally Ill People Likely to Be Color Blind

➤ THE MENTALLY ill are much more likely to be color blind than normal individuals. Approximately one out of every three men suffering from schizophrenia, the most common of mental diseases, had trouble in distinguishing colors, Dr. Harold M. Kaplan, Dr. Roland J. Lynch and associates at the Hospital for Mental Diseases, Secaucus, N. J., found by studying 403 cooperative psychotic patients.

A comparatively large number of mentally ill women were also found to be partially color blind, they reported to the *American Journal of Psychiatry*. The greatest number of schizophrenics of both sexes with color defects were unable to distinguish red from green.

These figures include only those who actually wanted to take part in the test. Others who refused to cooperate or whose natural tendency to give false replies made their scores worthless were excluded.

The doctors suggest the possibility that color blindness is not a peculiarity of the eye, but is associated with other body and mental features.

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IN SCIENC

MEDICINE

Some Skin Troubles May Be "Skin Diabetes"

➤ BOILS, ECZEMA, sweat gland abscesses and itching skin that fail to clear up with other forms of treatment may be "skin diabetes" and if so will respond promptly to a diet low in sugars and starches, Dr. Erich Urbach, of the University of Pennsylvania Medical School, reports in the *Journal of the American Medical Association* (Oct. 6).

Patients with this condition do not have symptoms of diabetes such as sugar in the urine or abnormally large amounts of sugar in the blood. Dr. Urbach believes that the condition is one in which the skin fails to utilize carbohydrates properly, perhaps because of some interference with the action of insulin involving only the tissues of the skin.

"Skin diabetes," therefore, is in his opinion a suitable term for the condition. Chemical analysis of tiny bits of skin show that in such cases the skin is storing more sugar than normal.

A typical diabetic diet, sometimes with insulin, clears up the skin condition promptly. If the patient goes back to a normal diet, the eczema, boils or other skin disorder reappears.

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CHEMISTRY

Pack Fresh Vegetables In Ice for Vitamin C

➤ PACKING freshly harvested vegetables in crushed ice is the best way to prevent loss of vitamin C during transportation and storage because it combines moisture and low temperature. After three days of storage in crushed ice, Swiss chard, broccoli and lettuce still held most of their original vitamin C, investigations conducted by the Wisconsin Experiment Station showed. Leaf lettuce, after six days of storage packed in ice and held in a cold room had lost less than 10% of its C.

The common practice of sprinkling lettuce or spinach to keep it fresh in retail markets was found to be of little help in saving the C vitamin. Moisture without refrigeration is of no benefit.

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CE FIELDS

ORNITHOLOGY

Pacific Island Birds May Become Extinct

➤ MANY SPECIES of Pacific island birds may become extinct because of military occupation, report Dr. Harvey I. Fisher, University of Hawaii ornithologist, and Paul H. Baldwin, U. S. National Park Service, who recently completed a survey of birds on Midway island.

Two species of birds formerly plentiful on Midway already most likely have become extinct, Dr. Fisher and Mr. Baldwin state. The Laysan rail and the Laysan finch, both of which were plentiful on Midway in 1941, have probably been wiped out. The only other known habitat of these species is Laysan island in the Midway group, from which both are believed to have disappeared some years ago.

Other birds, though perhaps not so rare, have also suffered. The "gooney bird", or Laysan albatross, has been reduced to less than half its estimated 1941 population. Whereas there were half a million Bonin Island petrel in 1941, the present population is estimated as 25,000. Only three noddy terns were found on Midway, where 2,000 were believed to exist before the war.

The importation by military shipping of rats which kill off birds; use of large areas for buildings, lawns and walks, eliminating vegetation and cover; and unavoidable slaughter of birds by planes landing and taking off are some of the reasons why military occupation of an island is devastating to bird populations. In addition, birds are unavoidably trapped in barbed wire, old gun emplacements and fox-holes. Bird eggs are also collected for eating.

Science News Letter, October 13, 1945

CHEMISTRY

Synthetic Tire as Good as Natural Rubber Tire

➤ A NEW synthetic rubber tire for automobiles, claimed as good as natural rubber tires, is made of a special variety of government GR-S-10 synthetic rubber in which a rosin-base soap replaces fatty-acid soap as an emulsifying agent. This is an important factor in attaining better wear, cooler running, and greater resistance to cracking and carcass bruising.

Another factor is the design of the tire. It has a tread that is wider than that of the conventional tire, which makes it roll more squarely and flatly along the pavement. Contrary to popular belief, this is a basic advantage, producing longer and more uniform tread wear, according to F. Ray Campbell, representative of the B. F. Goodrich Company whose engineers developed the new tire. The increased contact area of the tread means greater stability, better distribution of weight, and less scuffing of the tread, he states.

The new tire has a riding bar instead of a center groove, and this, along with other construction, gives it crack-growth resistance more than half again as great as that of comparable standard-design tires, it is claimed by the manufacturers. It is expected that the new tire will be available to the public reasonably soon.

Science News Letter, October 13, 1945

CHEMISTRY

Rubber Extracted By Fermentation Process

➤ RUBBER LOCKED up in the leaves of a tropical vine belonging to the milkweed family can be released through a fermentation process in which bacteria are used, members of the American Chemical Society were informed by a communication from Sam R. Hoover and associates at the Eastern Regional Research Laboratory of the U. S. Department of Agriculture. The paper was sent in for the Society's "meeting-in-print," which is being substituted this year for the regular meeting, called off because of wartime travel restrictions.

The vine, known botanically as *Cryptostegia grandiflora,* has the rubber scattered in the form of tiny globules through the green cells of its large, tough leaves, as well as in the latex vessels. No satisfactory means has ever been found for the mechanical extraction of this rubber, nor is chemical extraction effective as long as the leaves are intact. A decay-producing bacterium, *Clostridium roseum* solved the problem. It broke down the leaf structure and released the cell contents in which the rubber globules were embedded. These were screened out of the debris, then treated with chemical solvents to get out the rubber.

Laboratory tests, as well as incorporation with GR-S synthetic rubber in experimental tires, proved the Cryptostegia rubber to be of good quality.

Science News Letter, October 13, 1945

CHEMISTRY

Hydrochloric Acid Keeps Canned Vegetables Fresh

➤ VICTORY garden vegetables were kept from spoiling by adding enough dilute hydrochloric acid to make them very sour, in canning experiments carried on at Ohio State University by Prof. R. C. Burrell and three young women assistants, Miss Esther M. Johnson, Miss Beverlee J. Rice and Miss Phyllis J. Sohn. Results are reported in detail in the *Journal of Chemical Education* (Aug.).

The experiments were undertaken in an effort to find some means for keeping vegetables safe from bacterial spoilage and possible development of the deadly botulism contamination, in the face of the war-caused scarcity of pressure cookers. It was known that most bacteria cannot thrive in media of relatively high acidity. Hydrochloric acid was selected because while it is poisonous in concentrated form, in a dilute condition is not only harmless but a normal part of the gastic juice.

When the vegetables were acid enough to discourage spoilage bacteria they were much too sour to eat. This was overcome by stirring in a little baking soda just before preparing them for use.

An added benefit of the acid canning was the retention of most of the vegetables' vitamin content.

Science News Letter, October 13, 1945

ENGINEERING

Gas-Diesel Engine Has Higher Thermal Efficiency

➤ A NEW engine, developed by the Cooper-Bessemer Corporation, delivers more power for the amount of fuel consumed than any engine heretofore produced, it is claimed. It is a turbo-charged gas-diesel engine. Technically, it has high thermal efficiency, which is the term for the amount of fuel consumption in relation to power developed.

Its thermal efficiency is rated as over 40%, which is a higher record than ever obtained by a steam, gas, gasoline, gas turbine or diesel engine, the manufacturers state. The record was set during routine tests. The best record, heretofore, was established by the diesel engine, which operates usually between a range of 32% and 36%. The highest thermal efficiency claimed for a gas turbine engine is 29%; gas and gasoline engines usually attain up to 25%, and reciprocating steam engines from five to 18% thermal efficiency.

Science News Letter, October 13, 1945

PSYCHOLOGY

Psychology in Japan

The re-orientation and re-education of the Japanese is a psychological problem. They have not ceased their psychological warfare with the surrender.

By MARJORIE VAN DE WATER

➤ HALF A MILLION women will soon be welcoming returning sons or husbands who might have been mourning their dead except for the expert use of the world's mightiest weapon.

It wasn't the atomic bomb. It wasn't the rocket plane or jet propulsion. It wasn't radar.

Those were all extremely important in defeating the enemy. So were the flame throwers and bombs and bazookas, the parachute attacks and all the other modern devices of war.

But you can defeat an enemy without bringing about his surrender. Surrender is a state of mind. What made the Japanese sign on the dotted line with their army intact? What enabled the United States to "invade" Japan's mainland, welcomed by banquets served by a bowing, saluting enemy, instead of the desperate fighting of a cornered, fanatical foe?

The answer is believed by some U. S. officials to be in a weapon that is neither new nor secret, but which has never before been employed on so effective a scale for such an important goal. It is psychological warfare.

In a sense, of course, all warfare is psychological, because no matter how devastating is the destructive force of military measures they can never achieve their objective until the enemy reaches the point where he is willing to surrender.

Guns Are Silent

The guns are silent now. But the psychological problems remain. The Japanese are now engaged in an active campaign of psychological warfare against us which is not in any way robbed of its dangers by a cloak of ingratiating friendliness. And we will have our own psychological problems in the occupation of Japan. Certainly if we hope to bring about a complete re-education and re-orientation of the Japanese people, we face the greatest psychological problem yet encountered.

The present peace is easily lost if vigilance is relaxed and efforts lag, because the polite smile of the conquered naturally hides a deep smoldering resentment which can be fanned into a widespread outbreak of violence against the conquerors and against authority in general

Success in meeting the problem of how to produce in Japan a spirit of surrender points the way to an effective attack on the job of maintaining the peace.

On the basis of an intimate and accurate knowledge of the minds and behavior of the Japanese people and how they would act in response to action taken by this country, a psychological campaign was mapped out and then followed through to a dramatic conclusion.

A small group within the U. S. Navy, housed in improvised quarters in part of a converted garage, planned the psychological tactics. For the first time in history all the events in a campaign, diplomatic and also military, were dictated by the considerations of psychological warfare.

The goal was surrender without invasion. The priceless booty that was at stake—and that was brought home in triumph—was an officially estimated saving of half a million American lives.

Here are some of the highlights of the knowledge of Japanese psychology and current events that formed the sound basis for the psychological campaign.

1. The Japanese, as a people, are completely helpless without authority, without the presence of someone in command to tell them what to do. If they are fighting, they will continue fighting until they are told to stop. If they are faced with sudden unexpected disaster, they are unable to act even to save their own lives without specific direction.

2. A Japanese man cannot act for himself. Two men cannot come to a decision. Always it takes at least three Japanese to arrive at an important action. It is the fixed habit of Japanese thinking to work in council. For this reason, Japanese action is slow—it takes time to get men together, to discuss the issue, to reach agreement. But they can come to an agreement if ordered to do so.

3. The Japanese would never surrender, man by man, unit by unit, regiment by regiment as the Italians and later the Germans did. Surrender, for Japan, had to come from the top. Comparatively few Japanese soldiers were taken prisoner. Not one officer of the rank of general raised the white flag. Never did an organized group of Japanese soldiers lay down arms and give themselves up.

4. Japanese leaders knew they were defeated at the beginning of this year. An island nation cannot hope to win a war without a fleet. When the Japanese lost their fleet, they lost the war. It did not matter that they had a large Army undefeated. It didn't matter that they had men in China and Manchuria. It didn't matter that Japanese soldiers were strongly entrenched in rock caves in hundreds of tiny islands scattered over the Pacific. Without means of holding these forces together, supplying them, and communicating with them, Japan was lost and the leaders knew it.

5. The Japanese people were completely uninformed about their desperate plight. Even though the Emperor knew that further battle was useless and worse than useless—that each new day of war was taking fresh and profitless toll of Japanese life and property, he could not face his people with a proposal of surrender while they had no suspicion of their defeat.

6. Not only were the Japanese people ignorant of the fate of their fleet and their own helplessness, but they were ignorant of the power of the Allies. Scientific news did not reach them through the fog of "thought control." The atomic bomb must have been the first intimation many of the public had that scientists even hoped to split the atom.

7. Japanese leaders, faced with certain defeat, would be anxious—eager—to find some way to get out of the war. They would welcome any suggestion of how to make surrender seem reasonable to the Japanese people.

8. But the Japanese people are not plain-spoken, they are not direct. To bring about the surrender it would be necessary to speak their language figuratively as well as literally.

In an army of fanatical fighters such as the Japanese, trained from earliest childhood to revere the Emperor as God and to regard death in his service as a great honor and personal surrender as unspeakable disgrace, the difference between certain defeat and the laying down of arms may be very great indeed.

It was brought about by a carefully

planned program of psychological warfare based on thorough knowledge of Japanese character, history, and ways of thinking. Capt. Ellis M. Zacharias, of the U. S. Navy, and the small group that helped him plan this psychological campaign took it for granted that the Japanese leaders are realistic people. They knew that they faced defeat. But they were on the spot; they could see no way to get out of a war which meant only a daily mounting toll.

Capt. Zacharias knew that the objective of his psychological campaign must be to solve this problem for the Japanese. Surrender would have to come from the top, because it is a fixed habit of Japanese minds to be unable to act without orders from above. The Emperor himself must be the one dealt with.

Step by Step

This he did, step by step. As principal tool, he used a series of radio broadcasts in which he spoke in Japanese and also in English. His voice was well known in Japan, for he had been for many years in Japan as attache in the U. S. embassy. But the broadcasts were only one tool. They were backed by military events, carefully planned for psychological effect.

First, Capt. Zacharias reasoned, an emperor who wanted to get his people out of a war must know what leaders would be acceptable to the enemy to negotiate the peace. And so the first broadcast by Capt. Zacharias was filled with names.

They were not suggested as negotiators. In the first place, you don't speak so directly when talking to the Japanese. In the second place, "face" would not permit the Emperor to use or trust men forced on him by the enemy.

And so the wording of the broadcast was like this:

"I have always acted as a friend of the Japanese people and have done everything in my power to prevent the catastrophe which has already begun to envelop your homeland. Those among you who know me personally, and there are many in the highest places, will confirm this fact.

"Admiral Yonai will recall our many conversations after his return from Russia as a language officer. Admiral Nomura Kichisaburo will remember my frank discussions, both in Japan when Admiral Nagano often attended, and on his way to Washington to his last official assignment.

"Mr. Kurusu will know my regret in the loss of his son who as a young boy I often patted on the head. General Matsumoto, Washizu, Teramoto and Hirota will remember my frequent advice. Likewise Mr. Debuchi, Wakatsugi, Horinouchi and the staff of late Ambassador Saito. Your Premier Admiral Baron Suzuki may remember our meeting when he was chief of the Naval General Staff. My impression of him was fully confirmed by his recent sympathetic statement regarding our loss in the death of Franklin Delano Roosevelt.

"And finally their Imperial Highnesses Prince and Princess Takamatsu will recall, when, as their aide-de-camp, I accompanied them during their tour of two months in the U. S. in 1931."

The Japanese reply to this broadcast was equally indirect, but equally pointed. They did not go on the air with any statement about these men. But the Domei news agency immediately came out with the news announcement that Prince Takamatsu was appointed to represent the Emperor at official functions and Admiral Yonai had been appointed to a position of increased authority in the Japanese government. What better indication could we want that Japan was ready to talk terms—and our terms. That was in May, 1945.

What other help would the Emperor need to get him out of the war? Obviously, his people would have to be informed of Japan's military defeat. They knew nothing of this; the truth had been kept from them. This little mission of popular education was thoroughly taken care of by the U. S. Navy and Air Forces in attacks on the Japanese mainland—attacks timed to back up the broadcasts.

The Emperor would need reassurance that "unconditional surrender" would not mean the crushing or annihilation of the Japanese people—a fate worse for them than death in battle. This reassurance was given in the very first broadcast in an official statement by the President of the United States, reiterated over and over again in later broadcasts.

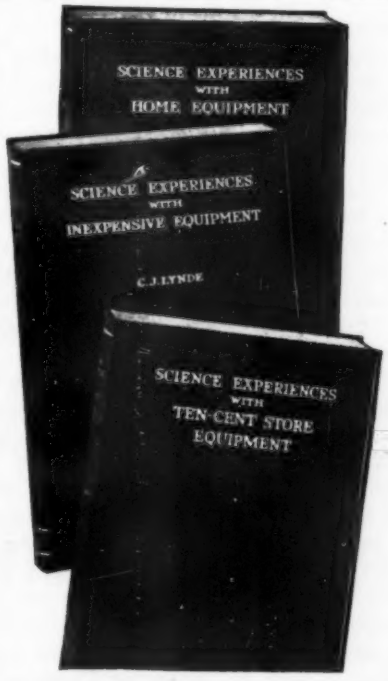
"It means providing for the return of soldiers and sailors to their families, their farms, their jobs. . . . Unconditional surrender does not mean the extermination or enslavement of the Japanese people."

Blame the military leaders, the Emperor was advised—always with subtle indirection. Get rid of them. They are responsible for the catastrophe that has overtaken Japan. They are failures and incapable of leading Japan.

Names and words of patriotic Japanese were mentioned in the broadcasts—men who had advised against Japan's pathway into war. Tell the people about these men, was the suggestion implied.

The Japanese are realistic, the broadcasts stressed. A patriotic Japanese leader is willing to face facts, to acknowledge past mistakes and about-face to pursue a wiser course to save Japan.

The broadcasts provided the Emperor with the means he needed for face-saving before his people. The outcome of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modern wars is determined, Capt. Zacharias told him, not by the bravery of the fighters or the people but by superior "war potential" which means superior industry for making the tools of war. To acknowledge defeat and surrender is patriotic and dignified—to go on fighting when all is lost would indicate lack of bravery and "shallow emotionalism."

Finally, since the Japanese are a historically minded people, and need to have their actions justified by past precedent, Capt. Zacharias provided the Emperor with chapter and verse from Japanese history in which one patriotic leader of the people surrendered honorably to another in order to save his clan from destruction. By surrender, Satsuma was saved to become the most prosperous province of Japan.

Capt. Zacharias also read in full a letter written in 1895 by Admiral Ito to the Chinese Admiral Ting, a personal friend, whom he advised to surrender for the best good of his people.

On July 21, 1945, Broadcast Number 12 went on the air. All that remained was to assure the Japanese that the United States offered unconditional surrender as a humanitarian gesture, that they might assume that it would be the United States who would enforce the formula and insure the peace, that the Atlantic Charter and the Cairo Declaration would apply.

On July 24, Dr. Inouye officially answered that Japan would surrender.

Twelve broadcasts—180 minutes on the air helped to save half a million American lives.

Now the Japanese guns are silent, but the Japs have not surrendered their weapons of psychological warfare.

The occupation forces entered Japan on an entirely different footing from that in Germany. In Japan, they were received with military bands playing and with radio and press blaring Japanese propaganda.

American correspondents were "received" in Japan by Japanese officials and "taken" to view what the Japanese most want them to see. But first they were put up in the best suite of the best hotel, in rooms reserved for General MacArthur.

Each day brought fresh tear-jerking stories of the "mysterious" effects of the atomic bomb. Japanese "scientists" are said to have investigated the strange deaths of people who went into the area weeks later and then suddenly died as though cursed. It is obvious what the Japanese would like to have stressed in the reports of American correspondents.

Missionaires Invited

Missionaries are being invited to return to Japan but Americans will be suspicious of the Japanese motives in this. Baseball players will probably be urged to visit Japan for remunerative exhibition games soon after the World Series.

The Japanese have done an excellent job of anticipating just what would be ordered by the occupation government and rushing to order these measures themselves.

Freedom of the press and freedom of assembly are to be restored, reports from Japan indicate. A general election is planned. Fraternization between Americans and Japanese is forbidden.

It is anticipated that there will be a wholesale "abolishing" of vicious institutions merely through changing the names to something new with a democratic sound. The Student Mobilization Bureau under the name Physical Education Bureau is no less jingoistic.

But the occupation government may be expected to see through all such ruses. And all these attempts to outdo the conquerors in revising their ways may be turned to good account if we keep alert to the implications.

In Japan there are many individuals, many groups, which are violently opposed to militarism and to the present dictatorial regime. These people are our friends. They need our help. Some have actually been in prison for 15 years. It is only necessary to see that they are now permitted to do what they want to do to rebuild Japan and the tremendous job of re-education and re-orientation will be taken care of for us.

Most important for Japan is a truly free press. And our interpretation of what constitutes a free press may be quite different from the ideas of the Japanese cabinet. The Japanese are a literate people. They read eagerly and widely if they have the opportunity.

Of major importance also is freedom of science. There should be international exchange of scientific information and thought (except the atomic bomb). Japanese scientists, like other scientists the world over, want to have the respect of their colleagues in other nations. The free criticism, or even the anticipation of criticism, from world-renowned scientists will serve to take the racist myths, the thought control, the fantasy and the just plain baloney out of Japanese science and education.

Education, psychologists know, cannot be distributed like vitamin pills which the Japanese might be forced to swallow for their own good. In order to learn it is necessary to want to know. And so education must be a voluntary activity. It can be supervised, but it cannot be effectively enforced. Fortunately, there are in Japan many sound individuals who will welcome the opportunity to teach without being hampered by Japanese militarists. It is only necessary to encourage and support their activity. They may be expected to cooperate with the Americans if permitted to do so.

In the development of a democracy or even the seeds of a democracy, the opinions, the wishes, the judgment of the people are of vital importance. Public opinion polls, based on sound scientific principles of a fair sampling of all groups —age, economic standing, religion, sex and education—will very likely be put into use and wisely interpreted to guide the occupation government and control the Japanese officials. Americans, with their knowledge of the importance of

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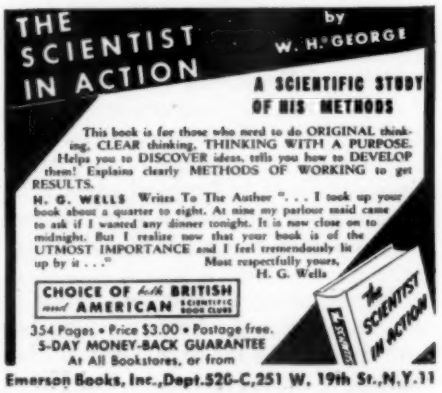
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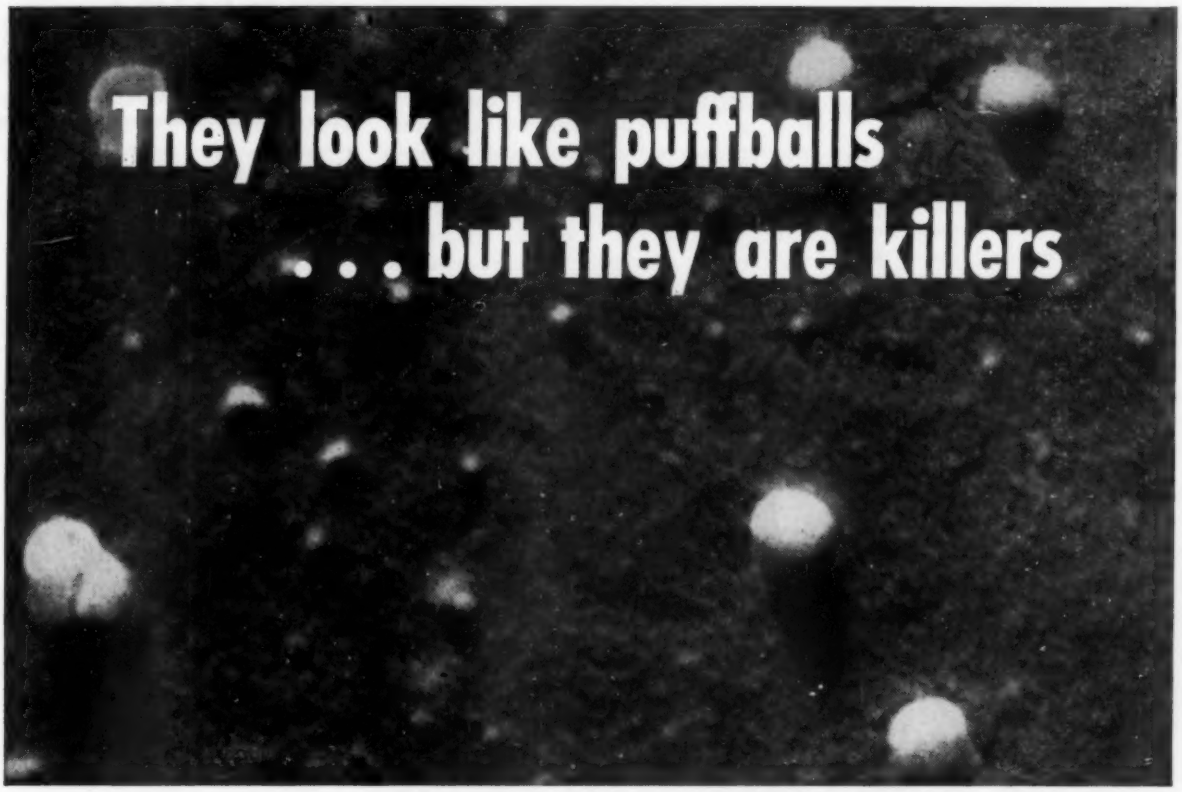

Influenza Virus X 110,000, as seen with the RCA Electron Microscope

To those who remember the deadly epidemic of influenza that followed World War I, this picture has a dread significance . . . for these innocent-appearing bits of woolly blobs are actually influenza-virus particles magnified 110,000 times. This remarkable electron micrograph was made by Dr. Ralph W. G. Wyckoff and Dr. Robley C. Williams at the University of Michigan.

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techniques of polling, are not likely to be fooled by "planted" polls with loaded questions, biased sampling or intimidated interviewees. They will beware also of the results of street-corner, amateur sampling of public opinions or judgments based only on the expressions of those who speak English or who volunteer to speak for the whole population.

One danger in thinking about the people of a foreign country, especially one so far away and culturally different from our own nation, is that of assuming that all the people are alike. This is easily avoided by those who know the Japanese, and those who know psychology.

In Japan, as in any large country, the individual citizens include the good and the bad, the educated and the ignorant, the stupid and the intelligent. They have been regimented for many years, it is true, but our hope of eventual re-orientation and successful occupation lies in a recognition that individuals differ. Some of the Japanese will always be our enemies no matter how much "education" they receive. Others, perhaps, have always been our friends.

Science News Letter, October 13, 1945

SPENCER MICROSCOPES

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With minature drills as small as .0040" in diameter, the operator produces Diesel engine injection spray tips with openings barely visible to the naked eye, yet held to remarkable close tolerances.

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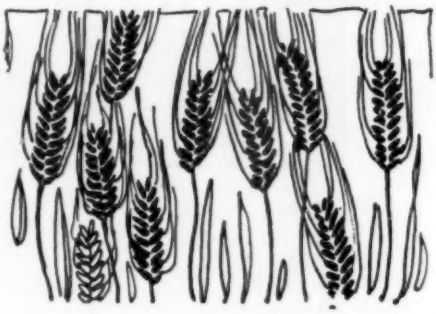
AGRICULTURE

NATURE RAMBLINGS

by Frank Thone



Two Acres Per Head

➤ JAPAN is a nation of tiny, hand-worked farms. We read, with the kind of pity that verges on contempt, that their average size is less than three acres each, and that each one has to support the family that tills it, pay an extortionate rent, and send a surplus of rice or millet to supply urban areas, or perhaps raise mulberry leaves to feed to the silkworms. We think of the broader acres of the American farmer, and tend to feel a bit smug about our better fortune.

But have we the right to feel this way? Has anyone on earth the right to feel spacious and uncrowded, when it comes to food-producing land? Ward Shepard, in his new book, *Food or Famine,* brings us up short with some decidedly arresting facts. According to an estimate of the Soil Conservation Service, he says, there are approximately four billion acres of cultivable and pasture lands on this planet. The world's population is about two billion persons. That divides out to an average of two acres of food-producing land per person. Here in our own country, there are rather less than two acres of plowland per person, not taking pastures and rangelands into account. So we aren't too far a leap ahead of the Japanese peasant: the precariousness of his source of living is simply dramatized by the fact that he is actually domiciled on his scrap of soil.

Moreover, Mr. Shepard warns, we are wasting our patrimony at an alarming rate, despite all our fine talk about conservation during the past two or three decades. Soil erosion, from over-cultivated farms, over-grazed rangelands and over-cut forests, has rendered about a fourth of our once useable soil areas

practically valueless and is inflicting progressively increasing damage on about half of what is left. To make money as fast as possible, we Americans are quite literally selling our farms down the river.

Nevertheless, Mr. Shepard is no mere Jeremiah, pessimistically prophesying unavoidable doom. There is yet time, he declares, and socially effective techniques for large-scale salvation of the land have already been invented. The two great nations with the largest areas of temperate-zone land, the U. S. A. and the U. S. S. R., approach the problem in different ways. On Russian collective farms, agronomic experts decide what needs to be done, and the farmers do as they are told. Americans farmers, with a long tradition of rather stiff-necked individualism, certainly would not be so biddable. With us, the democratically organized soil conservation district, hiring its professionally trained advisers, accomplishes the same end. If it becomes necessary to apply coercion to recalcitrant individuals, the moral as well as material weight of a majority vote is behind its actions. So far, this mechanism has been applied only to farm lands, but there is no reason why some modification of it should not be used on the even more difficult management problems of private forest lands.

Science News Letter, October 13, 1945

Graphite, a variety of carbon used as a lubricant, and in so-called "lead" pencils, crucibles and many industrial products, is found in most countries of the world, but much of it is not usable because of poor quality.

The *lima bean,* considered by many as the aristocrat of the bean family and the most delicious of all garden vegetables, is of South American origin but whether from Brazil or Peru is a matter of dispute.

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• Books of the Week •

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THE ART OF CALCULATION—Harry Sticker—*Essential Books,* 256 p., $2. Basic method of arithmetical calculation used by exports.

FOOD OR FAMINE, The Challence of Erosion—Ward Shepard—*Macmillan,* 225 p., illus., $3.

INTRODUCTION TO BIOLOGICAL LATIN AND GREEK—P. H. Yancey—Brooks, F. G., 24 p., paper, 20 cents. 2nd ed., revised. Bios Classroom series, no. 1.

MAN, MORALS AND SOCIETY: A Psychoanalytical Study—J. C. Flugel—*Int. Univs. Press,* 328 p., $4.50.

ORIGINS FROM MYTHOLOGY OF BIOLOG'CAL NAMES AND TERMS—P. H. Yancey—*Brooks, F. G.,* 47 p., paper, 20 cents. Bios Classroom series, no. 5.

REPTILES OF THE PACIFIC WORLD—Arthur Loveridge—*Macmillan,* 259 p., illus., $3. The Pacific World series.

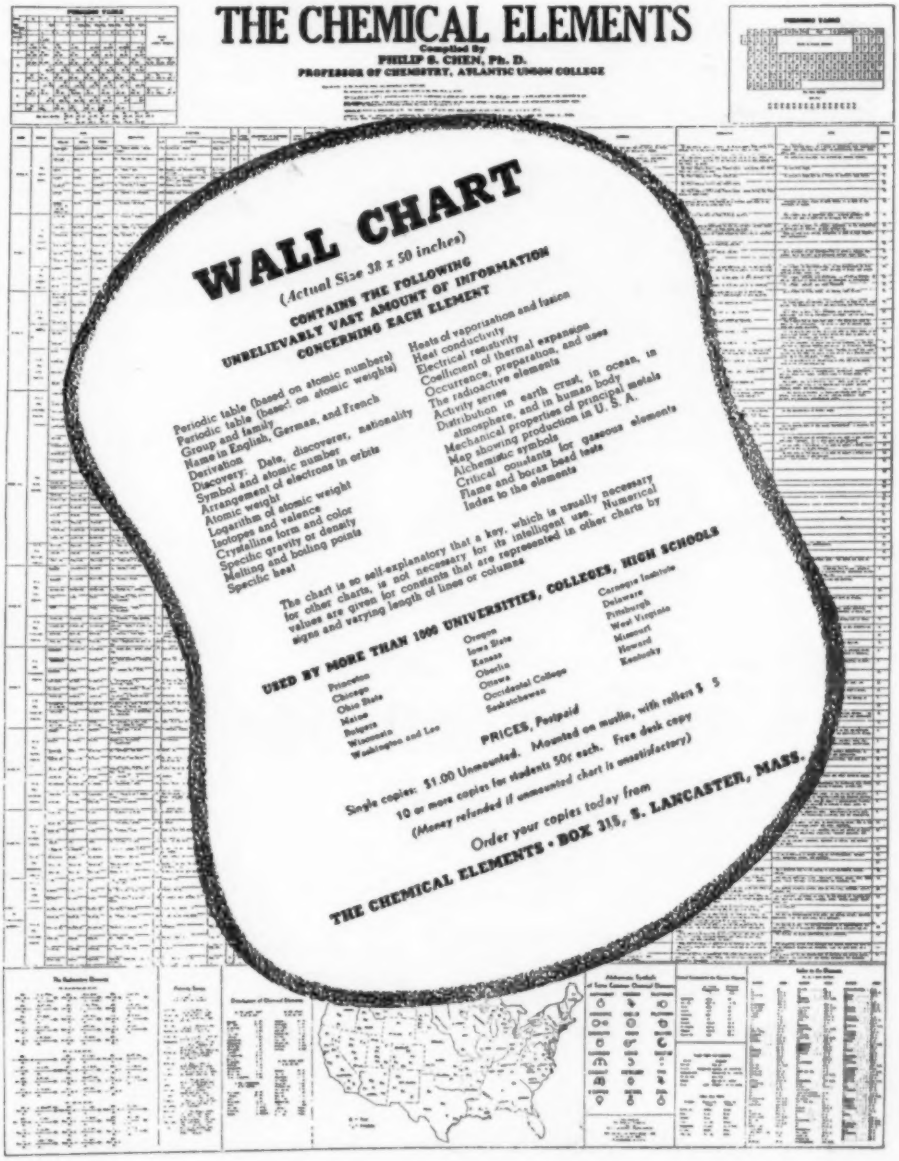
SCIENCE AND THE PLANNED STATE—John R. Baker—*Macmillan,* 120 p., $1.75.

SIXTY MILLION JOBS—Henry A. Wallace—*Simon and Schuster,* 83 p., paper, illus., $1. Cloth ed., $2, published jointly by *Reynal and Hitchcock* and *Simon and Schuster.*

THE TECHNOLOGY OF PLASTICS AND RESINS—J. Philip Mason and Joseph F. Manning—*Van Nostrand,* 493 p., illus, $6 50. Based upon a college course in the Chemistry of Plastics and Resins at Boston University.

WILLIS RODNEY WHITNEY: Pioneer of Industrial Research—John T. Broderick—*Fort Orange Press,* 324 p., illus., $3. Foreword by Dr. Karl T. Compton.

Science News Letter, October 13, 1945


THE CHEMICAL ELEMENTS
Compiled By
PHILIP S. CHEN, Ph. D.
PROFESSOR OF CHEMISTRY, ATLANTIC UNION COLLEGE
WALL CHART
(Actual Size 38 x 50 inches)
CONTAINS THE FOLLOWING
UNBELIEVABLY VAST AMOUNT OF INFORMATION
CONCERNING EACH ELEMENT
Periodic table (based on atomic numbers)
Periodic table (based on atomic weights)
Group and family
Name in English, German, and French
Derivation
Discovery: Date, discoverer, nationality
Symbol and atomic number
Arrangement of electrons in orbits
Atomic weight
Logarithm of atomic weight
Isotopes and valence
Crystalline form and color
Specific gravity or density
Melting and boiling points
Specific heat
Heats of vaporization and fusion
Heat conductivity
Electrical resistivity
Coefficient of thermal expansion
Occurrence, preparation, and uses
The radioactive elements
Activity series
Distribution in earth crust, in ocean, in atmosphere, and in human body
Mechanical properties of principal metals
Map showing production in U. S. A.
Alchemistic symbols
Critical constants for gaseous elements
Flame and borax bead tests
Index to the elements
The chart is so self-explanatory that a key, which is usually necessary for other charts, is not necessary for its intelligent use. Numerical values are given for constants that are represented in other charts by signs and varying length of lines or columns
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•New Machines and Gadgets•

⚙ *HOUSEHOLD GLOVES, made of synthetic rubber, have roughened fingers to assure a non-slip grip on soapy dishes and other slippery objects. Some gloves have a satinized inner finish, and others a fabric lining, to make them easy to pull on and off.*

Science News Letter, October 13, 1945

⚙ *TWIN-READER magnifier, that closes like a pocket knife for convenience, has dual lenses scientifically matched that give third-dimensional vision with true perception of depth. The lenses are of fine optical glass, and the field of observation is triple that of old-type single-lens magnifiers.*

Science News Letter, October 13, 1945

⚙ *GAS TANK cap, for automobiles, is theft-proof and siphon-proof, and requires no lock and key. Conical shaped, it fits all filler pipes, and when installed cannot be removed. Baffles cast in its bottom eliminate bubbling and spilling during filling, and prevent siphoning.*

Science News Letter, October 13, 1945

⚙ *STORAGE compartment in the back of a passenger seat in a railroad car utilizes none of the space between the seats and is large enough for personal articles within easy reach. Its hinged front, when opened, swings downward to form an adjustable writing table.*

Science News Letter, October 13, 1945

⚙ *PLASTIC SLEEVES for ordinary pliers shown in the picture provide a good grip for slippery gloves or bare hands in cold weather. They are hammered onto the handles without cracking or splitting. Being of non-conducting material they provide insulation for work on electric lines.*

Science News Letter, October 13, 1945

⚙ *ELECTRONIC device, a sensitive pressure instrument to measure gas or liquid pressure, utilizes the principle that the electrical characteristics of a wire filament change with a physical strain. It contains a very fine filament wire bonded to a hollow metal core against which the pressure is exerted.*

Science News Letter, October 13, 1945

⚙ *EJECTOR SOCKET, to shoot out used photoflash lamps employed with a camera synchronizer when the picture is taken, relieves the photographer of removing the hot lamp by hand. The flash bulb, when pushed into the socket, compresses a spring which is released at will by a push-rod.*

Science News Letter, October 13, 1945

⚙ *COMB, BRUSH and mirror combination is similar to the ordinary hair-brush with a handle, but has a row of teeth along one side of the brush which passes through the hair ahead of the bristles. The mirror is inside a hinged back on the brush.*

Science News Letter, October 13, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 280.

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